

Forensic Toxicology Services Manual

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Mission

The Utah Forensic Toxicology Laboratory (FTL) conducts toxicological analyses, issues written reports of results, and provides expert witness testimony and consultations on matters relative to criminal statutes in the state of Utah. These services are provided to the Office of the Medical Examiner (OME), law enforcement agencies, and other governmental entities involved in criminal matters.

The discipline of Forensic Toxicology involves the analysis of biological samples to determine the presence of drugs and other substances. Typical substances identified include ethanol, marijuana, and prescription drugs. Toxicology analyses are used to:

- Assist the OME in determining cause and manner of death (Utah Code Section 26-4-7);
- Provide information in cases involving automobile homicides (Utah Code Section 76-5-207) or suspects driving under the influence (DUI) of alcohol and/or drugs (Utah Code Section 41-6a-502).

Quality Statement

The Utah FTL will continually strive to meet customer needs by ensuring the quality, reliability, objectivity, and relevance of its laboratory data through the quality system described in this manual.

The quality system applies to all work performed in the laboratory's facility and has been designed to meet the requirements for laboratory accreditation & standards established by the American Board of Forensic Toxicology, the Society of Forensic Toxicologists, the American Academy of Forensic Sciences, and other authorities as appropriate.

Specimen Submission Requirements

Specimen submission requirements are summarized in:

[Appendix A: Quick Reference Guide for Delivering Specimens](#)

[Appendix B: Quick Reference Guide for Mailing Specimens](#)

1. A certified phlebotomist must collect the specimens in accordance with universal safety precautions. To obtain information on certification, contact the Utah Department of Health, Bureau of Emergency Medical Services at 800-284-1131.
2. Specimen Documentation

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- The Toxicology Analysis Request Form must be completed and included with the specimen(s). The current form is available online on the [FTL website](#)¹.
- The submitting officer is responsible for indicating the tests to be conducted on the specimens. Please limit tests to the suspected drugs or drug categories. Unnecessary additional requests are costly and prevent the laboratory from reporting case results in a timely manner. For more information on the Laboratory's current testing services, see [Appendix C: Testing Panels](#). Or contact the laboratory for additional questions regarding our testing capabilities.

3. Specimen Containers

- Blood: The recommended container for blood collection is a 10mL gray top blood collection tube containing both a preservative (100 mg sodium fluoride) and an anticoagulant (20 mg potassium oxalate). The preservative helps prevent deterioration of drug in the specimen and the anticoagulant prevents the specimen from clotting.
- Urine: The recommended container for urine collection is a plastic urine container designed specifically for urine testing that is tolerant to shipping conditions as well as freeze/thaw cycles. Preservatives are not required.
- Several vendors provide pre-made kits that are specifically designed to meet the needs of forensic toxicology testing. Below are some examples and not meant to suggest an endorsement.
 - <https://www.tritechforensics.com/products/specimen-collection/Blood-Urine-Specimen-Collection/bu-3-blood-and-urine-specimen-collection-kit-2-tubes-1-bottle-25-case>
 - https://www.lynnpeavey.com/product_info.php?cPath=40_59&products_id=399
 - <http://www.crime-scene.com/store/a-bau-10-blood-and-urine-alcohol-specimen-collection-kit.shtml#>
 - <http://www.sirchie.com/blood-urine-specimen-collection-kit.html#.WXt5nIjyuUk>

4. Specimen Volume

Minimum Specimen Volume Requirements For Testing	
Blood or urine alcohol	2 ml
Blood drug screen	20 ml (2 x 10mL gray top tubes)
Urine drug screen	20 ml

Note: These volumes are ideal. The lab understands that sometimes less volume is all that is available. The lab will work to determine testing priorities in cases with limited ample volume.

5. Specimen Type

¹ Website: <http://www.health.utah.gov/lab/toxicology/index.html>

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- Always collect blood for cases involving driving performance and/or impairment.
- Collect urine for cases on which the presence/absence of a substance is sufficient (e.g., underage drinking cases, sexual assault cases, etc.).

6. Specimen Labeling

Using water-resistant ink, the specimen tubes must be labeled, at a minimum, with the following information:

- The suspect's first and last name; and
- The agency's case number.

7. Specimen Seals

- A tamper-resistant seal must be placed across the top of the stopper or cap of the specimen container.
- The person sealing the specimen container must initial and date the seal. **DO NOT** use identification labels to seal the tube.
- **NOTE:** this is an evidence seal to ensure specimen integrity during shipping. It is not a leakage seal.

8. Specimen Storage

- Specimens should be kept secure and refrigerated until shipped or delivered to the laboratory.

9. Specimen Chain of Custody Information

- Ensure that the chain of custody information at the bottom of the Toxicology Analysis Request Form is completed prior to submitting the sample.
- The "Law Enforcement Chain of Custody Report" (separately available on our website) is provided for use within the submitting agency. These are to be maintained within the agency and do not get submitted with the specimens.

10. Specimen Submission Methods

- **Delivering Specimens to the Laboratory**
 - Each sealed and labeled blood specimen tube must be placed in an envelope or other sealable container. Polyethylene urine containers must be placed in a sealable plastic pouch or other sealable container. These containers must be sealed, initialed, and dated by the person sealing the container.
 - Specimens can be delivered to the Laboratory through the delivery entrance (North side) during business hours.
 - **NOTE:** The sample receiving window can experience periods of high volume. Please feel free to contact the laboratory prior to drop-off if you are time-limited.
- **Mailing Specimens to the Laboratory**

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Each Specimen tube or container must be labeled, sealed, initialed and dated. The tubes must be placed in the cushioned receptacles in the blood collection kit. Polyethylene urine containers must be placed in the sealable plastic pouches in the urine collection kits. These containers must contain sufficient absorbent material to absorb the entire liquid contents of the collection tube/container in the event of breakage/leaking during transit.

These containers must then be placed in a crush-proof shipping container made of cardboard. If not pre-printed on the cardboard container, biohazard labels must be affixed to the exterior.

It is also required that the inner and outer containers used for the specimen tubes and container be sealed, initialed and dated by the person sealing the container.

Mailed specimens must meet blood borne pathogen shipping requirements and be packaged to fully contain leakage/spillage in accordance with applicable federal laws (PHS 42 CFR Part 72, rule 173.199). https://pe.usps.com/text/pub52/pub52apxc_024.htm These measures are necessary to protect your agency personnel, postal/delivery personnel, and laboratory staff from exposure to disease in the event that the specimen tubes leak or break in transit. Specimens that have leaked will be returned to the submitting agency.

Please see above for commercial vendors of approved kits.

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Analytical Results

- The Utah FTL issues final reports to the submitting law enforcement officer electronically by email or fax. Please ensure that reports are distributed in a timely manner to all other involved parties (e.g., records department, prosecutor's office, etc.).
- When final reports are not available, preliminary reports may be issued to the Driver License Division and will be available to officers at the driver license hearing. Please do not request additional preliminary reports to be issued to you separately. Note that preliminary reports provide only presumptive results and these results may not be confirmed upon further testing.
- Laboratory results are considered "private" under State GRAMA laws. Release of records will be in accordance with current State law. Please contact the laboratory with any questions.
- A "negative" result on a toxicology report, does not necessarily mean drugs were not present or ingested. Only that the lab either does not test for a particular drug (see below) or that reporting criteria were not met. Please contact the laboratory with any questions.

Specimen Return

1. Specimens are retained in the laboratory's evidence refrigerator for a maximum of 8 weeks after the final report is issued. Should an agency require additional testing, the request must be made during this time period.
2. After the 8 week storage period, specimens are repackaged and returned to the submitting agency.

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Appendix A: Quick Reference Guide for Delivering Specimens

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Instructions for Delivering Blood Specimens to the Toxicology Laboratory

- Always collect blood for cases involving driving performance and/or impairment.
- Only collect urine for cases on which the presence of a substance is sufficient (for example: underage drinking cases).
- For any questions, call (801) 965-2451.



Collect 2 samples in 10mL glass grey top tubes. Label each tube with suspect's First and Last Name and your agency case #. Use evidence tape to seal tubes. Initial and date the seals.



Insert tubes in an envelope. We recommend including an absorbent pad and using a padded envelope. Absorbent pad must be of sufficient size to absorb any leakage of tube contents. Use evidence tape to seal the envelope. Initial and date the seal.

Enter all information on the current Toxicology Request Form. Ensure that both the tubes and the form have exactly the same suspect name and agency case number. The current form is available online at: www.health.utah.gov/lab/toxicology

Deliver the samples to the laboratory and collect chain of custody sample receipt for all samples.

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Instructions for Delivering Urine Specimens to the Toxicology Laboratory

- Always collect blood for cases involving driving performance and/or impairment.
- Only collect urine for cases on which the presence of a substance is sufficient (for example: underage drinking cases).
- For any questions, call (801) 965-2451.



Collect 30mL of urine and tightly cap the container. Label each tube with suspect's First and Last Name and your agency case #. Use evidence tape to seal container. Initial and date the seals.



Insert urine container and absorbent pad into secondary container. Absorbent pad must be of sufficient size to absorb any leakage of container contents. Seal the secondary container. Initial and date the seal.

Enter all information on the current Toxicology Request Form. Ensure that both the tubes and the form have exactly the same suspect name and agency case number. The current form is available online at: www.health.utah.gov/lab/toxicology

Deliver the samples to the laboratory and collect chain of custody sample receipt for each sample. For questions on this procedure, call: (801) 965-2451

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Appendix B: Quick Reference Guide for Mailing Specimens

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Instructions for Mailing Blood Specimens to the Toxicology Laboratory

- Always collect blood for cases involving driving performance and/or impairment.
- Only collect urine for cases on which the presence of a substance is sufficient (for example: underage drinking cases, sexual assault cases).
- For any questions, call (801) 965-2451.



Collect 2 samples in 10mL glass grey top tubes. Label each tube with suspect's First and Last Name and your agency case #. Use evidence tape to seal tubes. Initial and date the seals.

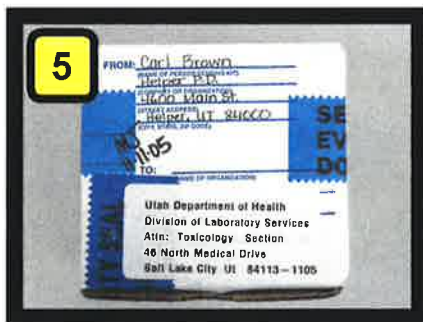


Insert tubes and absorbent pad in a secondary container. Absorbent pad must be of sufficient size to absorb any leakage of tube contents. Secondary container must be crushproof to 17psi.



Cap the secondary container. Use evidence tape to seal the container. Initial and date the seals.

Enter all information on the Toxicology Request Form. Ensure that both the tubes and the form have exactly the same suspect name and agency case number.



Insert secondary container and request form into shipping box. Use evidence tape to seal the box. Initial and date the seals.

Ensure mailing address and return address are on the box and send to the laboratory.

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Instructions for Mailing Urine Specimens to the Toxicology Laboratory

- Always collect blood for cases involving driving performance and/or impairment.
- Only collect urine for cases on which the presence of a substance is sufficient (for example: underage drinking cases, sexual assault cases).
- For any questions, call (801) 965-2451.



Collect 30mL of urine and tightly cap the container. Label each tube with suspect's First and Last Name and your agency case #. Use evidence tape to seal container. Initial and date the seals.



Insert urine container and absorbent pad into secondary container. Absorbent pad must be of sufficient size to absorb any leakage of container contents. Seal the secondary container. Initial and date the seal.

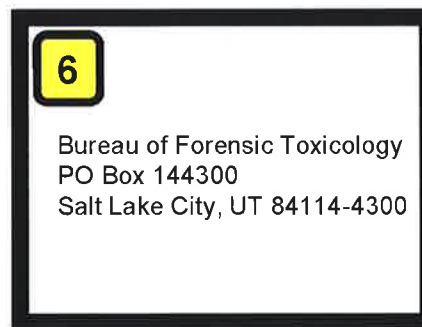
Enter all information on the Toxicology Request Form. Ensure that both the tubes and the form have exactly the same suspect name and agency case number.



Insert secondary container and request form into shipping box.



Use evidence tape to seal the box. Initial and date the seals.



Ensure mailing address and return address are on the box and send to the laboratory.

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Appendix C: Testing Panels

Following is a list of all the drugs included in our testing panels. The BFT services are subject to change depending on resources and/or changing customer needs.

For drugs not included in the BFT testing panels above, specimens may be sent to a reference laboratory at the expense of the submitting agency.

1. Volatiles Panel

Volatiles Panel					
Method: HS/GC ⁱ					
Drug Class	Drugs	Reporting Limits (grams/100mL or %)		General Detection Times	
		Blood	Urine	Blood	Urine
Volatiles	Ethanol	0.01	0.01	3-12 hours	
	Acetone	0.01	0.01	n/a	n/a
	Isopropanol				
	Methanol				

- **Unless there are extenuating circumstances or a specific request, no further testing is conducted on specimens resulting in blood ethanol > 0.08 grams/100ml.**

2. Drugs of Abuse Panel

Drugs of Abuse Panel					
Methods: ELISA ⁱⁱ , LC-MS/MS, GC/MS ⁱⁱⁱ					
Drug Class	Drugs	Reporting Limits (micrograms per milliliter)		General Detection Times	
		Blood	Urine	Blood	Urine
Amines	Amphetamine	0.05	0.10	1 - 3 days	3 - 5 days
	Methamphetamine				
	MDA				
	MDMA				
Cannabinoids (Marijuana)	THC	1 ng/ml	N/A	1-6 hours depending on frequency of use	3 – 27 days depending on single, moderate or chronic use
	THC-COOH (metabolite)	5 ng/ml	15 ng/ml		
Cocaine	Cocaine	0.05	0.10	5 hours	12 hours
	Benzoyllecgonine (metabolite)			varies	2 - 4 days
Opiates	Morphine, etc.	0.05	0.10	1 - 4 hours	3 - 4 days

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3. Prescription (Rx) drug Panel

Prescription Drug and OTC Drug Panel				
Method: LC-MS, LC-MS/MS, GC/MS				
	Drugs	Blood Reporting Limits (micrograms per milliliter)	General Detection Times	
		Blood	Blood	Urine
Multiple Drug Classes	Alprazolam (e.g., Xanax)	0.01	<p>In general, prescription and over-the-counter drugs can be detected in blood within 4-24 hours, and in urine for 2-4 days.</p> <p>Urine results are reported as Negative or Positive</p>	
	α -OH Alprazolam (active metabolite of Alprazolam)	0.01		
	Amitriptyline: (e.g., Elavil)	0.02		
	Butalbital (Fioricet)	2		
	Carbamazepine (e.g., Tegretol)	5		
	Carisoprodol (e.g., Soma)	2		
	Chlorpheniramine (e.g., Triaminic)	0.02		
	Chlordiazepoxide (e.g., Librium)	0.01		
	Clonazepam (e.g., Klonopin)	0.01		
	7-aminoclonazepam (inactive metabolite)	0.01		
	Codeine (e.g., Brontex)	0.005		
	Cyclobenzaprine (e.g., Flexeril)	0.005		
	Dextromethorphan (e.g., in Robitussin)	0.02		
	Diazepam (e.g., Valium)	0.01		
	Diphenhydramine (e.g., Nytol, Sleep Aid)	0.02		
	Doxylamine (e.g., Unisom)	0.02		
	Fentanyl (e.g., Actiq)	0.005		
	Norfentanyl (e.g., inactive metabolite)	0.005		
	Hydrocodone (e.g., Lortab)	0.005		
	Lorazepam (e.g., Ativan)	0.01		
	Meperidine (Demerol)	0.02		

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	Meprobamate	2	
	Methadone (e.g., Methadose)	0.02	
	Midazolam (e.g., Versed)	0.01	
	Nordiazepam (e.g., Nordaz)	0.01	
	Nortriptyline (e.g., Aventil)	0.02	
	Oxazepam (e.g., Serax)	0.01	
	Oxycodone	0.02	
	Phenobarbital (e.g., Luminal)	2	
	Phenytoin	5	
	Propoxyphene	0.02	
	Temazepam (e.g., Restoril)	0.01	
	Tramadol (e.g., Ultram)	0.005	
	Trazodone (Desyrel)	0.02	
	Zaleplon (e.g., Sonata)	0.01	
	Zolpidem (e.g., Ambien)	0.01	

NOTE: This list is being routinely updated. Please contact the laboratory with any inquiries regarding our test menu.

ⁱ Headspace Gas Chromatography

ⁱⁱ Enzyme Linked Immunosorbent Assay

ⁱⁱⁱ Gas (G) or Liquid (L) Chromatography & Mass Spectrometry

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